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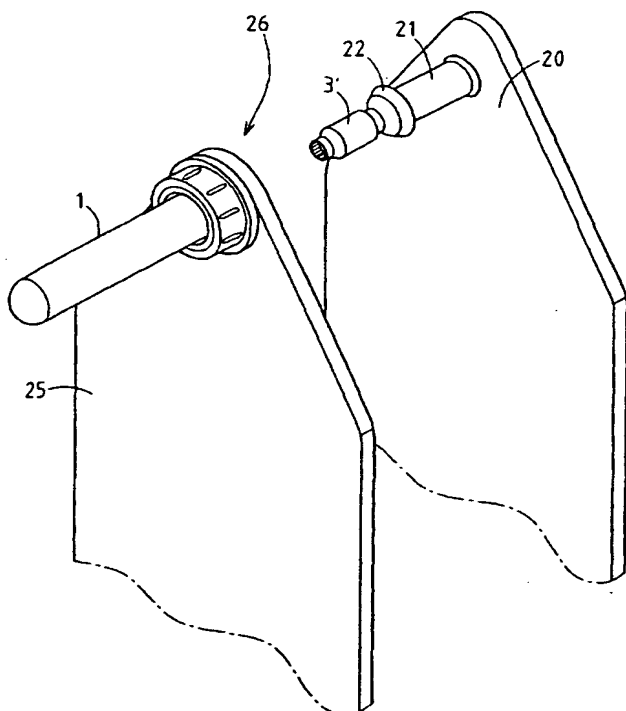
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(54) Title: **SYSTEM FOR TAGGING A BIOLOGICAL OBJECT AND FOR TAKING A SAMPLE OF THE BIOLOGICAL OB-
JECT**



(57) Abstract: A system for tagging a biological object and taking a sample of the biological object, the object being in particular an animal. The system comprises a first tag part, a second tag part and a pin having a first end and a second end, which pin is connected to the first tag part at a first end thereof and which pin is provided with a head at the second end. The second tag part is provided with a receiving opening for the head of the pin, such that the pin can be pressed through a part of the biological object, in particular through an ear of an animal, and then through the receiving opening of the second tag part are connected by means of the pin to each other and to the biological object. The system further comprises a sample container having an opening for introducing a sample of biological material from the object in the sample container, which sample container has a body with a circumferential wall and at an axial end thereof the opening and at the opposite axial end a bottom. The sample container is connected via a detachable connection to the second tag part, such that the opening of the sample container is aligned with the receiving opening of the second tag part. The system further comprises a plug for closing the opening after introduction of the sample into the sample container, which plug is located on the head of the pin. By pressing the pin through the biological object a sample is taken from the biological object and is introduced into the sample container, after which the opening of the sample container is closed by the plug.

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System for tagging a biological object and for taking a sample of the biological object.

The invention relates to the tagging of a biological object and taking a sample of the biological object.

In particular the invention relates to the tagging and taking a sample of animals, especially for the reliable
5 identification of each animal.

Over the last years the desire and need for a reliable identification of animals has increased for various reasons. In particular if the meat of the animals is destined for the human consumption or if the animals will form part of the human
10 consumption chain in some other manner the need for a reliable identification is strong. An example is the CJD or BSE-problem, where the accurate determination of the source and the life of the animals are of the utmost importance. A reliable
15 identification of animals also plays a role, however, if no consumption of the animal is envisaged, but, for example, for pets, (race-)horses, etc. The invention, however, also relates to the tagging and sampling of other biological objects, such as plants.

It is known from the prior art to provide each animal
20 with an ear tag. Nowadays it is even in many cases required to provide an ear tag on each ear of the animal. Such an ear tag can be provided with visually readable recognition signs, e.g. an identification number, which can be read by a person or a machine-readable identification, such as a bar code. It is
25 further known to provide an ear tag with an electronic transponder, which can be attached detachably to the ear tag or can be integrated in a part of the ear tag.

A preferred application of the invention relates to a system which not only provides for the application of an ear
30 tag to an animal, as has been explained before, but also in the more or less simultaneous taking of a sample of biological material from the animal. The sample of biological material is then in particular intended for the identification of the

animal on the basis of the "genetic finger print", which can be determined on the basis of the sample taken. Of course the sample can also be used for other purposes. Systems which allow the application of an ear tag as well as the taking of a sample of the animal have been developed rather recently and are for instance disclosed in WO 99/12475 and WO 99/61882.

These known systems have a number of drawbacks.

The present invention has as an object to provide various measures to obtain an improved system. The proposed measures can be applied independent from each other as well as in various combinations. The improvements presented here in particular relate to the production of the tag, the protection against fraud, which is not optimal in the known systems, and further the application of the tag.

A first aspect of the invention relates to a system according to claim 1. By using the annular wall the sample container can be connected detachably to the second tag part in an efficient manner, in particular in view of the production technique.

Preferably an embodiment is envisaged wherein the second tag part is made of a soft plastic material and has a relatively hard collar member when compared to the soft material of the second tag part, which collar member forms the receiving opening for the head as well as has a part for the connection of the sample container. It will be clear that this "double use" of the collar member is advantageous when considering the production technique and also allows a reliable detachable connection of the sample container. Preferably in this system the connection of the sample container to the second tag part remains intact prior to and during the introduction of the plug into the opening of the sample container and the connection is only released when the plug has been brought in the sample container and the opening of the sample container has been closed thereby. This measure has as an object to provide an improvement over the embodiment according to figure 16 of WO 99/12475. In this known embodiment

the sample container already is torn from the second tag part before the sample has been brought in the sample container and the container has been closed by the plug. The tag has, however, already been fitted in a correct manner to the ear.

- 5 This makes it possible to stop after the fitting of the ear tag and the tearing off of the sample container and to commit fraud, for instance by filling the already loosened and still open sample container with another sample.

- 10 If no use is made of a collar member for the connection of the sample container provision may be made for the sample container, at least the part thereof which is to be connected to the second tag part, to be made from a plastic material which does not or hardly adhere to the plastic material of the second tag part, for instance from polyethylene or
- 15 polypropylene whereas the second tag part is made from polyurethane. Preferably the embedding of the sample container is such that upon releasing the connection irreparable damage occurs so that a connection which has been released once can not be repaired.

- 20 A further aspect of the invention relates to a system according to claim 16, which is characterised in that the plug has a body with a ring of a hard material, said ring extending at or near the outer circumference of the plug and being embedded in a softer material. The hard ring renders it
- 25 difficult to remove the plug at a later stadium from the sample container without causing major damages.

- A further aspect of the invention relates to a system according to claim 18. In the case of this embodiment of the plug, preferably in combination with a receiving opening of the
- 30 second tag part formed by a hard body, the effect is obtained that the application of the tag is easy and in case of an ear tag is not unwarranted harmful for the animal. This embodiment of the plug is based upon the embodiment as described in US 6 021 592.

- 35 A further aspect of the invention relates to a tag application device according to claim 22. This device allows to push the plug away from the head of the pin at a suitable

moment. With this device the plug with the sample container can be, for instance be displaced to release the sample container from the second tag part after the plug has been brought into the sample container.

5 The tag application device can for instance be actuated by hand or by foot but can also be provided with a mechanical actuation, for instance electrical or pneumatic. Further the device can be suitable to be hand-held, but the device can also be mounted on a support.

10 A further aspect of the invention relates to a system according to claim 23. After removal of the filled sample container the covering cap remains behind on the second tag part and thus prevents the unauthorised manipulation of the tag, for instance an attempt to press the head of the pin back
15 through the receiving opening in the second tag part.

 The present invention provides according to a further aspect thereof a system according to the preamble of claim 24, which system is characterised in that the sample container is provided with an electronic transponder. A further transponder
20 can be provided here, which is arranged on one of the tag parts or the pin.

 The transponder in the sample container allows for a simple identification of the sample container in a laboratory where the sample is being analysed.

25 Preferably the electronic transponder is embedded in the sample container. This measure renders it nearly impossible to commit fraud by removing the transponder from the sample container and replacing it by another transponder. Such an act will always result in damage to the sample container, which is
30 visible or can be shown by other means.

 Preferably a unique identification code of the associated sample container is stored in the transponder of the sample container, preferably in a manner which renders it impossible to change this code at a later stage. As is known a transponder
35 can be provided with a read-only memory but in combination therewith or as an alternative also with a read-write memory.

In a preferred embodiment the sample container is free of visible identification signs which by any means could result in a link between the sample container and the associated tag parts which are to be provided on the biological object. By this measure the effect is obtained that persons handling the closed sample containers cannot determine the link with the tag. It can thus be envisaged that a farmer shortly after tagging a number of animals notices that one of the animals is ill. He could then try not to forward the sample container associated with this animal to the authority where the registration of the animals takes place and the samples are analysed. As the sample containers are free of visible identification signs the farmer can then not or hardly retrace which sample container belongs to this animal. Therefore he will be forced to forward all sample containers. Also the staff of the authority or of the laboratory cannot recognise the sample containers in this way which provides another protection against fraud.

Preferably a unique first identification code is stored in the transponder of the sample container and the sample container further has no other identification code. Preferably the tag then has a unique second identification code, which differs in a non-systematic manner from the unique first identification code of the associated sample container, which second identification code is arranged on the first and/or second tag part and/or pin. By the absence of a systematic link between both identification codes, for instance obtained by assigning these codes with a random generator, it becomes extremely difficult to commit fraud.

In a preferred embodiment of this concept the first and the second identification code, which together form a pair, are arranged on the tag by the manufacturer of the system. It is preferred here that the sample container is detachably connected to the tag, so that the pair of identification codes is not split before the tagging of the object has been effected.

It is then preferred that the pair of associated unique identification codes is solely stored in a secure database authorised by the authority, which issues the identification codes. The manufacturer as well as the authority can then hold
5 this database. The access to the database can be restricted to a limited number of authorised persons, so that fraud is also prevented in this way. In this manner the effect can be obtained that in a laboratory where the samples are analysed, it is impossible to retrace to which tag and thus to which
10 object a sample belongs. The results of the analyses can only be linked to the object through the database described herein before.

The man skilled in the art will understand that the aspects of the invention can be realised independent from each
15 other and in many different combinations.

The various aspects of the invention will hereinafter be explained referring to the drawings. In the drawings:

Fig. 1a shows a sample container, plug and separated transponder of the system according to the invention,

20 Fig. 1b shows the closed sample container of fig. 1a after taking of a sample,

Fig. 2 shows in combination with the sample container and the plug of fig. 1 a first ear tag part provided with an integral pin as well as a second ear tag part to which the
25 sample container is connected detachably,

Fig. 3 shows in cross-section the second ear tag part with the sample container connected detachably,

Fig. 4 shows partly in cross-section the application of an ear tag and the taking of a sample using the system shown in
30 fig. 3,

Fig. 5 shows the release of the closed sample container from the ear tag fitted on the ear (not shown),

Fig. 6 shows the jaws of an application device, wherein the second jaw holds the sample container with the plug
35 therein, which is not fully in its closed position,

Fig. 7 shows the arrangement of fig. 6 from another direction,

Fig. 8 shows a system according to the invention after completion of the application of the ear tag and the taking of the sample and closing of the sample container, however prior to the release of the sample container,

5 Fig. 9 shows the hard element which is embedded in the plug of the system according to fig. 8 and

Fig. 10 shows an alternative embodiment of the hard element of the plug.

10 In fig. 1 a sample container 1 is shown having an opening 2 for the introduction of a sample biological material from an animal, in this example from an ear of an animal, in the sample container 1. Further a plug 3 is shown for closing the opening 2 after introduction of the sample into the sample container 1.

15 As will be explained further below a sample of the ear is taken upon pressing a pin through the ear and is introduced via the opening 2 into the sample container 1, where after the opening 2 is closed by the plug 3.

The filled and closed sample container 1 is shown in fig. 20 1b in cross-section.

In fig. 1b it can be recognised that the sample container 1 is provided with an electronic transponder 4 which is embedded in the sample container 1. This transponder has been shown separately in fig. 1.

25 In the transponder 4 a unique identification code for the associated sample container 1 is stored, which code can be read with suitable communication equipment.

It can be recognised that the sample container is entirely free of visible identification signs which by any means could form a link between the sample container and the associated tag parts which are to be applied to the biological object as will be described below.

30 The sample container has a body with a circumferential wall 6 and at an axial end the opening 2 and at the opposite axial end a bottom 7.

35 The body of the sample container is constituted from a first part 8, which contains a retaining rim 9 for the plug 3,

and a second part 10, which contains the bottom 7 and the transponder 4 embedded therein. The first part 8 is manufactured independent from the second part 10 and then fitted to the second part 10. For instance the first part 8 is placed in an injection mould and the second part 10 is moulded thereon.

The inwardly protruding retaining rim 9 forms an abutment for the plug 3 when one wants to pull the plug 3 from the container 1.

10 The retaining rim 9 is part of a separate member, which is preferably manufactured from a harder material than the surrounding material of the container 1 and is embedded in said softer material. The retaining rim 9 is connected via a frangible connection - formed here by a cross-section of
15 reduced area - to the surrounding ring 11 of the separate member, such that upon an attempt to pull the plug 3 (which has been pushed beyond the retaining rim 9) from the sample container 1, the retaining rim 9 tears away from the ring 11 and thus from the body of the sample container 1. Fraud can be
20 easily recognised hereby.

It can be recognised here that the front of the plug 3 is provided with a depression 12 wherein the sample of biological material is located.

Fig. 1b also shows that the plug 3 has a body of a first
25 material on which body a ring 14 of a harder second material is fitted, which ring 14 extends at or near the outer circumference of the plug 3.

In fig. 2 the parts of a system for ear tagging an animal as well as for taking a sample of the animal can be recognised
30 in a state prior to the treatment of the animal.

Further to the parts for sampling which have been explained referring to figs. 1 and 2, the system comprises an ear tag. This ear tag here comprises a first plastic tag part
20 with a plate shaped body and an integral pin 21 having a
35 head 22. The head forms an outwardly protruding annular shoulder with respect to the shaft of the pin 21. The outer

circumference of the head 22 forms a conical ring surface. On the head of the pin 21 the plug 3' is located.

5 The ear tag further comprises a second tag part 25. The second tag part 25 has a plate shaped body and is provided with a receiving opening 26 for the head 22 of the pin 21, such that the pin 21 can be pressed with its head and the plug 3' thereon through the ear of the animal and then through the receiving opening 26 of the second tag part 25, whereby the first and second tag parts are connected via the pin to each other and to
10 the ear.

For a further explanation referral is now made to the figs. 3 and 4. In fig. 3 the preferred embodiment of the second tag part 25 and in particular of the connection of the sample container 1 to the second tag part 25 are shown in detail.

15 The second tag part 25 has an essentially plate shaped body of a first plastic material of a relatively soft and easily bendable quality. In an annular wall of said soft first plastic material a collar member 15 of a second material is embedded, preferably also of a plastic material, which is
20 harder than said first material.

The collar member 15 has been manufactured in a separate process by injection moulding and has then be placed in the mould for the second tag part 25.

25 Preferably it is envisaged that the collar member 15 is made from a plastic material whereof the Vicat temperature lies above 140°C, most preferably near 160°C. Hereby it is impossible to heat the second tag part with boiling water such that the collar member 15 becomes weak and the head of the pin 21 can then be pushed back through the receiving opening 26
30 without damage.

The collar member 15 is essentially ring shaped and has a continuous bore 16. At one end the collar member 15 has an inwardly protruding rim 17, which forms the receiving opening 26 through which the plug 3' and the head 22 of the pin 21
35 pass. At the other end a part of the bore 16 of the hard body 15 is adapted for the detachable connection of the sample container fitting therein. In particular this part is provided

with a groove in which the edge 45 of the sample container 1 fits.

In fig. 3 it can be recognised that the sample container 1 lies against an annular rim 17 with its front face, which rim 17 also forms the retaining rim 17 for the head of the pin 21.

In the figs. 3 and 5 furthermore anchoring protrusions 18 formed on the outer circumference of the collar member 15 can be recognised which improve the attachment of the collar member 15 to the softer material.

10

The sample container is preferably manufactured as a separate part and then fitted on the collar member 15. Preferably this connection takes place directly after the injection moulding of the second tag part, whereby the soft plastic material has been moulded around the collar member 15. Directly after the injection moulding the collar member 15 then still is so warm that the sample container 1 can be pressed into the bore 16 of the hard body 15. After cooling then a solid but detachable connection is obtained.

In an alternative the sample container 1 first is placed in the collar member 15 and then in an injection mould for the tag part 25. In another alternative the collar member 15 is moulded around the sample container 1.

Fig. 4 shows that the plug 3' - an alternative of the plug 3 - is fitted on a positioning protrusion 28 at the front of the pin 21. This positioning protrusion 28 is located in front of the head 22 of the pin 21.

The pin 21 has an internal bore which is closed at the front end of the pin 21 and open at the side of the plate shaped body. The bore extends into the positioning protrusion 28 for the plug 3'. In this bore in fig. 4 a stable metal support mandrel 30 extends which forms part of a first jaw of an application device not shown here in any further detail. The support mandrel 30 stabilises the pin 21 during the application of the ear tag and transfers the pressing force to the plug 3', which is needed to press the plug 3' and the pin 21 through the ear.

Fig. 4 further shows a second jaw 32 of the application device which forms a support face 33 for the end of the annular wall of the second tag part lying around the receiving opening 26.

5 Fig. 4 shows that the sample container 1 is connected detachably to the second tag part 25 such that the opening 2 of the sample container 1 is aligned with the receiving opening 26 of the second tag part 25.

10 When the jaws 31, 32 are pressed towards each other from the position shown in fig. 4 the plug 3' comes to bear against the ear 40 and is then pressed through the ear 40. Herewith a sample of ear tissue, skin and hair is removed from the ear 40, which sample partly comes in the cavity at the front side of the plug 3'. Then the plug 3' reaches the second ear tag part
15 25 and is then pressed through the receiving opening 26 thereof and enters the sample container 1. Following this the head 22 of the pin 21 passes through said opening 26. It will be clear that the sample container 1 is thereby pressed from its seat and finally released from the engagement with the collar member
20 15. Finally the shoulder of the head 22 comes behind the rim 17.

The connection of the sample container 1 to the ear tag part 25 is therefore such that said connection of the sample container to the second tag part remains intact prior to and
25 during the introduction of the plug 3' in the opening 2 of the sample container 1. Only when the jaws 31, 32 are pressed towards each other even further, the force on said connection exceeds an allowable threshold and the connection is released. Hereby the already closed sample container 1 becomes free of
30 the ear tag part 25. After withdrawal of the pin 30 from the ear tag part 20 the ear 40 of the tagged animal is released and the filled sample container 1 remains in the opening 34 of the second jaw 32. After removal of the sample container 1 a new assembly of sample 1 and tag part 25 can be placed on the
35 second jaw 32 and a tag part 20 on the pin 30 of the first jaw 30 for the tagging and sampling of a further animal.

Fig. 5 shows the fitted ear tag with ear tag parts 20, 25 and pin 21 and the sample container 1, wherein for the sake of clarity the plug 3' somewhat protrudes from the container 1.

The figs. 6 and 7 show a part of a tag application device 5 having first and second receiving means for the associated parts of the tag (not shown) and the sample container 1 embodied here as jaws 31, 32. The jaws 31, 32 are accommodated in a application device which is not shown further, for instance hand operated pliers as shown in EP 0 092 408, such that the jaws 31, 32 can be pressed towards each other for the application of the tag and the taking of the sample.

The jaw 32 is provided here with an insertion opening 34 for the sample container 1. The jaw 32 preferably is provided with clamping means, for instance clamping ribs around the insertion opening, to lightly clamp the sample container 1 such that it does not fall out of the jaw after taking the sample unintentionally.

In order to be able to place the second tag part with the sample container connected thereto on the jaw 32 and to hold it a spring biased clamping bracket 46 is present on the jaw 32 - at the side facing the jaw 31 - so that a part of the second tag part can be clamped between the clamping bracket 46 and the jaw 32. The clamping bracket 46 extends in a U-shape around the jaw 32 and the ends of the clamping bracket are connected to a push button 50.

Upon depressing the push button 50 the clamping bracket 46 can be moved away from the jaw 32 as well as perform a tilting movement (see arrow B in fig. 6) so that the tag part with the sample container 1 connected thereto can be placed on the jaw 32.

In order to facilitate the removal of the closed sample container 1 from the opening 34 in the jaw 32 an ejector mechanism 50 can be provided, which is for instance connected to the push button 50.

Referring to the figures 8 and 9 now a preferred embodiment of the system according to the invention will be explained.

The system comprises an ear tag having a first tag part 100, a second tag part 101 and a pin 102.

A first end of the pin 102 is connected to the first tag part 100. The connection depicted here allows a rotation of the plate shaped ear tag part 100 with respect to the pin 102. In an alternative embodiment the pin 102 is manufactured integrally with the ear tag part 100.

At the other, second axial end the pin 102 is provided with a head 103 which forms an annular shoulder protruding outwards from the shaft of the pin 102.

The pin 102 is provided over its entire length with a continuous bore so that the pin 102 is tubular.

The second tag part 101 is provided with a receiving opening for the head 103 for the pin 102, which receiving opening is formed by an inwardly protruding rim of the collar member 105. The collar member 105 is made of a harder material than the remainder of the second tag part 101 and is embedded therein during the injection moulding of the softer material.

In fig. 8 also a sample container 110 is shown having an opening for the introduction of a sample biological material from the ear (not shown) into the sample container.

The sample container has already been closed by an associated plug 120 in the illustration of fig. 8.

The sample container 110 can be designed as has been described referring to figs. 1 and 2.

The plug 120 here is of a special embodiment. The plug 120 has a body of a first plastic material with an essentially conical outer surface 121 and with a point 122 at one end and an annular shoulder surface at the other end.

In the conical body an element 130 is embedded of a second material having a greater hardness than the first material. The element 130 has been shown in detail in fig. 9. In particular it is envisaged that first the hard element 130 is manufactured and then the soft material of the body of the plug is injected into a suitable injection mould.

The hard element 130 forms a plurality of cutting members 131 distributed around the circumference of the conical body,

which cutting members 131 extend from the point 122 in the direction of the shoulder at the other end of the plug 120. As an example for cutting members 131 are provided here. These cutting members 131 could protrude from the conical surface or
5 be flush with said surface or even lie somewhat beneath said surface and thus be covered by a thin layer of soft material.

The hard element 130 further has at its rear end a circumferential ring 132, which forms the annular shoulder of the plug 120. The cutting members 131 are connected to this
10 circumferential ring 132.

The hard element 130 further has a central column 133, which extends axially through the plug 120 and forms the point 122 of the plug 120. The central column 133 is provided with an insertion depression 149 at its rear end for a plug operating
15 and positioning rod 150 (see fig. 8) associated with the application device.

The head 103 of the pin 102 is provided with a hard anchoring element 160, which is embedded in the softer material of the pin 103. As an alternative the entire pin 102 with the
20 head 103 is made of a relatively hard material.

The anchoring element 160 is provided with a central passage through which the rod 150 extends.

The application device further comprises a hollow support mandrel 151 for the pin 102, wherein the rod 150 can slide to
25 and fro in the hollow support mandrel 151.

The hollow support mandrel 151 is fixed to a first jaw 153 of the tag application device. The free end of the support mandrel 151 lies against the rear side of the anchoring element 160.

30 Prior to the application of the ear tag the plug 120 preferably is integral with the pin 102, such that the connection in the zone between the plug 120 and the head 103 can be released at a suitable moment by exerting an excessive force on said connection. This can be done by a suitable
35 dimensioning of said connection.

The sample container 110 is provided with an annular flange 111, which is embedded here in the soft material of the

second ear tag part 101. As an example the annular flange 111 is made of PE or PP and the softer material of the second ear tag part 101 PU. This choice of materials causes that an attachment is obtained between both parts, however, an
5 attachment, which will break upon exceeding a certain load.

When the ear tag is fitted, the first ear tag part 101 with the pin 102 connected thereto and the head 103 and the plug 120, which is then still integral with the pin 102, is pushed on the mandrel 151 of the first jaw 153. Preferably the
10 rod 150 already extends into the depression 149.

The second ear tag part 102 and the sample container 110 connected thereto is mounted on the second jaw 155 of the tag application device.

Then the jaws 153 and 155 are moved towards each other so
15 that the conical or pointed plug 120 bears against the ear and then enters the ear. The abutment of the hard column 133 against the hard anchoring element 160 and of said part 160 against the mandrel 151 causes an effective transmission of the pressing force.

20 The point 122 pierces the ear after which the cutting members 131 as it were cut the ear in the form of a cross. Then a cutting action is obtained between the ring 132 and collar member 105 of the second ear tag part 101. The ear tissue parts, which have, now been but loose are pushed further by the
25 head 120 and enter into the sample container 110.

As soon as the head 103 of the pin 102 engages behind collar member 105 the ear tag is fitted correctly on the ear. The plug 120 now still forms a whole with the head 103. By now operating the rod 150 the plug 120 is torn from the head 103
30 and pushed into or further into the opening of the sample container.

Fig. 8 shows that the sample container 110 is provided with a ring 11 near the opening as has been described before.

As soon as the plug 120 engages behind the ring 11 the
35 plug 120 comes into contact with abutments 170 which block the pressing of the plug 120 further into the container 110.

If the plug 120 is now pressed further yet by means of the rod 150, the effect is achieved that the container 110 is released from the second tag part 101.

By now moving the jaws 153 and 155 apart and withdrawing the rod 150 the ear provided with the tag is released from the application device and the closed sample container 110.

Fig. 10 shows an alternative embodiment of the hard element 130 as shown in fig. 9.

The hard element 200 is designed to be embedded in a softer material of the plug.

The plug has a body with a front point part 201 formed by the hard element 200 and there behind a conical outer surface 202 at the outer circumference, which conical outer surface 202 is essentially delimited by the softer material (not visible in fig. 10).

The hard element 200 forms a number of - for example four - cutting members 203 distributed around the plug, wherein each cutting member 203 extends from the point part 201 in the conical outer surface 202.

The hard element 200 further comprises a circumferential ring 204, which is positioned at a distance behind the point part 201 and forms a part of the outer surface of the plug. The cutting members 203 extend between this circumferential ring 204 and the point part 201.

For the transfer of the pressing force from the point part 201 to the rod 150 (or the support mandrel 151 if the rod is absent) provision is made for a column 205 formed by the hard element 200.

The point part 201 comprises an annular wall 206, which delimits a cavity 207 open at the side of the point for receiving the sample.

It will be clear that the conical part 22 of the head of the pin 21 in fig. 4 can be provided in a similar manner with a hard element having a circumferential ring as well as a plurality of cutting members distributed around the circumference of the conical outer surface.

An assembly formed by a tag and an associated sample container, which are detachably connected to each other, is preferably associated with a pair of unique identification codes, wherein the unique first identification code is solely
5 stored in a transponder of the sample container and wherein the unique second identification code has a non-systematic deviation from the first identification code and wherein the second identification code is provided on the ear tag.

As an example the second identification code is printed on
10 the ear tag but it can also be envisaged that the second identification code is stored in a transponder which is integral with the ear tag.

Preferably the pairs of associated unique first and second identification codes are solely stored in a database of an
15 authority authorised to issue identification codes.

In an alternative a transponder is also present in the plug.

The invention also relates to the assembly of the sample container from a first part, which contains the retaining rim
20 for the plug, and a second part, which at least contains the bottom, wherein the first part is made separate from the second part and then mounted on the second part. This measure is in particular advantageous as the retaining rim can now be made to protrude inwardly rather far so that the plug cannot be removed
25 from the sample container. This prevents fraud. The two-part embodiment allows the injection moulding of the first part in a mould with a core, which defines the inner circumference of the first part and the side for abutment of the plug of the retaining rim. Further the first part can be made from a
30 different, for example harder, material than the second part. This allows for instance to make fraud by removing of the plug from the sample container still more difficult by means of the hardness of the retaining rim, while the second part of the sample container can be made of a softer material, for example
35 pierceable by a needle of an analysing apparatus in a laboratory. In this embodiment it is also possible that the

plug is entirely or partly made from a hard non-pierceable material.

CLAIMS

1. System for tagging a biological object and taking a sample
5 of the biological object, the object being in particular an
animal, comprising:
- a first tag part,
 - a second tag part,
 - a pin having a first end and a second end, which pin is
10 connected to the first tag part at a first end thereof and
which pin is provided with a head at the second end,
 - wherein the second tag part is provided with a receiving
opening for the head of the pin, such that the pin can be
pressed through a part of the biological object, in particular
15 through an ear of an animal, and then through the receiving
opening of the second tag part, whereby the first and second
tag part are connected by means of the pin to each other and to
the biological object,
- the system further comprising:
- 20 a sample container having an opening for introducing a sample
of biological material from the object into the sample
container, which sample container has a body with a
circumferential wall and at an axial end thereof the opening
and at the opposite axial end a bottom, which sample container
25 is connected via a detachable connection to the second tag
part, such that the opening of the sample container is aligned
with the receiving opening of the second tag part,
a plug for closing the opening after introduction of the sample
into the sample container, which plug is located on the head of
30 the pin, such that upon pressing the pin through the biological
object a sample is taken from the biological object and is
introduced into the sample container, after which the opening
of the sample container is closed by the plug,
- characterised in that** the second tag part has an annular wall
35 with a bore aligned with the receiving opening, and in that the
sample container is detachably connected in the bore formed by
the annular wall.

2. System according to claim 1, wherein the second tag part has a body of a first material and is provided with an embedded collar member of a second material which is harder than said first material, which collar member on the one hand delimits the receiving opening through which the plug and the head of the pin can pass and on the other hand has a part wherein the sample container is detachably connected.
3. System according to claim 2, wherein the detachable connection of the sample container to the collar member provides such a retaining force that said detachable connection remains intact prior to and during the introduction of the plug in the opening of the sample container, and wherein the detachable connection is only detached after the plug has been brought into the sample container and the opening of the sample container has been closed thereby.
4. System according to one of more of the preceding claims, wherein the sample container extends till close to the receiving opening such that the plug first enters the sample container and the sample container, which has been closed thereby, is pressed away by the head of the pin as the head passes the receiving opening.
5. System according to one or more of the preceding claims, wherein the system further comprises a tag application device provided with a first receiving means for the first tag part and the pin with plug on the one hand and with a second receiving means for the second tag part and the sample container on the other hand.
6. System according to claim 5, wherein the pin has an internal bore and the first receiving means is provided with a support mandrel for the pin fitting in said bore.

7. System according to claim 5, wherein the pin has an internal bore over its length and wherein the first receiving means is provided with a support mandrel fitting in the bore of the pin, wherein a reciprocable rod extends through the support
5 mandrel, the rod being adapted to engage the plug such that by displacement of the rod with respect to the support mandrel the plug can be displaced from the head of the pin.

8. System according to one or more of the preceding claims,
10 wherein the detachable connection of the sample container has been obtained by manufacturing the sample container as a separate part and embedding the sample container in the second tag part and/or the collar member thereof during injection moulding or by pressing the sample container in the still warm
15 collar member after injection moulding of the second tag part and/or the collar member thereof.

9. System according to one or more of the preceding claims, wherein the plug has a body with a ring of a hard material
20 which extends at or near the outer circumference of the plug and is embedded in a softer material.

10. System according to one or more of the preceding claims, wherein the body of the sample container forms an inwardly
25 projecting retaining rim at the opening which prevents pulling the plug from the sample container, and wherein the retaining rim of the body of the sample container is connected by a frangible connection to the body of the sample container, such that upon an attempt to pull a plug which has been pressed
30 beyond the retaining rim from the sample container, the retaining rim is released from the body of the sample container.

11. System according to one or more of the preceding claims,
35 wherein the body of the sample container forms an inwardly projecting retaining rim at the opening which prevents the pulling of the plug from the sample container, and wherein the

sample container is constituted by a first part, which comprises the retaining rim, and a second part, which at least comprises the bottom, wherein the first part has been manufactured independent from the second part and has then been
5 connected to the second part.

12. System according to one or more of the preceding claims, wherein the plug has a body with an element of a hard material which is embedded in a softer material, which body has a point
10 at the front and a conical outer surface at the outer circumference there behind, which conical outer surface is essentially delimited by the softer material, wherein the element of hard material forms the point and also one or more cutting members spaced around the plug, wherein each cutting
15 member extends starting from the point in the conical outer surface.

13. System according to claim 12, wherein the element of hard material further comprises a circumferential ring behind the
20 point, which circumferential ring forms a part of the outer surface of the plug, and wherein the one or more cutting members are integral with the circumferential ring.

14. System according to claim 12 or 13, wherein the point of
25 the plug forms a sharp conical point.

15. System according to claim 12 or 13, wherein the point comprises an annular wall, which delimits a cavity which is open at the side of the point.
30

16. System for tagging a biological object and taking a sample of the biological object, the object being in particular an animal, comprising:
- a first tag part,
35 - a second tag part,

- a pin having a first end and a second end, which pin is connected to the first tag part at a first end thereof and which pin is provided with a head at the second end,
- wherein the second tag part is provided with a receiving opening for the head of the pin, such that the pin can be pressed through a part of the biological object, in particular through an ear of an animal, and then through the receiving opening of the second tag part, whereby the first and second tag part are connected by means of the pin to each other and to the biological object,
the system further comprising:
a sample container having an opening for introducing a sample of biological material from the object into the sample container, which sample container has a body with a circumferential wall and at an axial end thereof the opening and at the opposite axial end a bottom,
a plug for closing the opening after introduction of the sample into the sample container, such that upon pressing the pin through the biological object a sample is taken from the biological object and is introduced into the sample container, after which the opening of the sample container is closed by the plug,
characterised in that the plug has a body with a ring of a hard material, which extends at or near the outer circumference of the plug and is embedded in a softer material.

17. System according to claim 16, wherein the body of the sample container forms an inwardly projecting retaining rim at the opening which prevents pulling the plug from the sample container, and wherein the retaining rim of the body of the sample container is connected by a frangible connection to the body of the sample container, such that upon an attempt to pull a plug which has been pressed beyond the retaining rim from the sample container, the retaining rim is released from the body of the sample container.

18. System for tagging a biological object and taking a sample of the biological object, the object being in particular an animal, comprising:

- a first tag part,
- 5 - a second tag part,
- a pin having a first end and a second end, which pin is connected to the first tag part at a first end thereof and which pin is provided with a head at the second end,
- wherein the second tag part is provided with a receiving
- 10 opening for the head of the pin, such that the pin can be pressed through a part of the biological object, in particular through an ear of an animal, and then through the receiving opening of the second tag part, whereby the first and second tag part are connected by means of the pin to each other and to
- 15 the biological object,

the system further comprising:

- a sample container having an opening for introducing a sample of biological material from the object in the sample container, which sample container is connected by a detachable connection
- 20 to the second tag part, such that the opening of the sample container is aligned with the receiving opening of the second tag part,

- a plug for closing the opening after introduction of the sample into the sample container, which plug is located on the head of
- 25 the pin, such that upon pressing the pin through the biological object a sample is taken from the biological object and is introduced into the sample container, after which the opening of the sample container is closed by the plug,

- characterised in that** the plug has a body with an element of a
- 30 hard material which is embedded in a softer material, which body has a point at the front and a conical outer surface at the outer circumference there behind, which conical outer surface is essentially delimited by the softer material, and in that the element of hard material forms the point and also one
- 35 or more cutting members spaced around the plug, wherein each cutting member extends from the point in the conical outer surface.

19. System according to claim 18, wherein the element of hard material further comprises a circumferential ring behind the point, which circumferential ring forms a part of the outer surface of the plug, wherein the one or more cutting members are integral with the circumferential ring.

20. System according to claim 18 or 19, wherein the point of the plug forms a sharp conical point.

10

21. System according to claim 18 or 19, wherein the point comprises an annular wall, which delimits a cavity which is open at the side of the point.

22. Tag application device for tagging a biological object and for taking a sample of the biological object, which object in particular is an animal, the tag comprising:

- a first tag part,
- a second tag part,
- a pin having a first end and a second end, which pin is connected to the first tag part at a first end thereof and which pin is provided with a head at the second end, and which pin has an internal bore over its length,
- wherein the second tag part is provided with a receiving opening for the head of the pin, such that the pin can be pressed through a part of the biological object, in particular through an ear of an animal, and then through the receiving opening of the second tag part, whereby the first and second tag part are connected by means of the pin to each other and to the biological object,
- the system further comprising:
 - a sample container having an opening for introducing a sample of biological material from the object in the sample container,
 - a plug for closing the opening after introduction of the sample into the sample container, which plug is located on the head of the pin,

such that upon pressing the pin through the biological object a sample is taken from the biological object and is introduced into the sample container, after which the opening of the sample container is closed by the plug,

5 wherein the tag application device is provided with a first receiving means for the first tag part and the pin with plug on the one hand and with a second receiving means for the second tag part and the sample container on the other hand,

characterised in that the first receiving means is provided
10 with a support mandrel fitting in the bore of the pin, wherein a reciprocable rod extends through the support mandrel, the rod being adapted to engage the plug such that by displacement of the rod with respect to the support mandrel the plug can be displaced from the head of the pin.

15

23. System for tagging a biological object and taking a sample of the biological object, the object being in particular an animal, comprising:

- a first tag part,
 - 20 - a second tag part,
 - a pin having a first end and a second end, which pin is connected to the first tag part at a first end thereof and which pin is provided with a head at the second end,
 - wherein the second tag part is provided with a receiving
25 opening for the head of the pin, such that the pin can be pressed through a part of the biological object, in particular through an ear of an animal, and then through the receiving opening of the second tag part, whereby the first and second tag part are connected by means of the pin to each other and to
30 the biological object,
- the system further comprising:
- a sample container having an opening for introducing a sample of biological material from the object in the sample container, which sample container is connected via a detachable
35 connection to the second tag part,
 - a plug for closing the opening after introduction of the sample into the sample container,

such that upon pressing the pin through the biological object a sample is taken from the biological object and is introduced into the sample container, after which the opening of the sample container is closed by the plug,

5 **characterised in that** the second tag part is provided with a covering cap at the side of the receiving opening facing away from the insertion side of the pin, which covering cap delimits a cavity for the head of the pin and is provided with a passage opening where along the sample biological material
10 pushed forward by the head of the pin can pass and enter the sample container which is placed behind the covering cap.

24. System for tagging a biological object and taking a sample
of the biological object, the object being in particular an
15 animal, comprising:

- a first tag part,
- a second tag part,
- a pin having a first end and a second end, which pin is connected to the first tag part at a first end thereof and which pin is provided with a head at the second end,
- wherein the second tag part is provided with a receiving opening for the head of the pin, such that the pin can be pressed through a part of the biological object, in particular through an ear of an animal, and then through the receiving opening of the second tag part, whereby the first and second tag part are connected by means of the pin to each other and to the biological object,

the system further comprising:

a sample container having an opening for introducing a sample
30 of biological material from the object in the sample container,
a plug for closing the opening after introduction of the sample
into the sample container,

such that upon pressing the pin through the biological object a sample is taken from the biological object and is introduced into the sample container, after which the opening of the sample container is closed by the plug,

characterised in that the sample container is provided with an electronic transponder in which transponder a unique first identification code of the sample container has been stored.

- 5 25. System according to claim 24, wherein the sample container is entirely free of visible identification signs which by any means could provide a link between the sample container and associated tag parts which are to be applied to the biological object.

10

26. System according to claims 24 or 25, wherein the first and/or second tag part and/or the pin is provided with a unique second identification code which differs in a non-systematic manner from the unique first identification code of the
15 associated sample container.

27. Method for the identification of biological objects, which are provided with tags and where from a sample has been taken using a system according to claim 26, wherein the pairs of
20 associated unique first and second identification codes are solely stored in a proprietary database authorised by an authority entitled to issue identification codes.

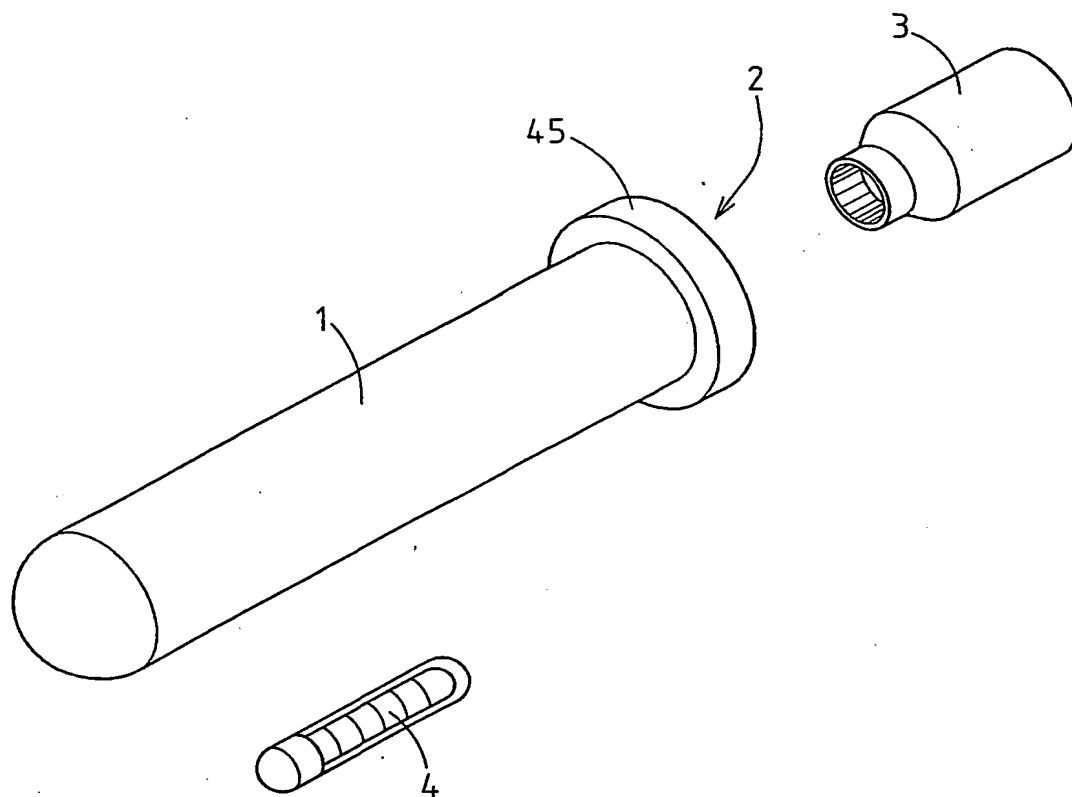


FIG. 1a.

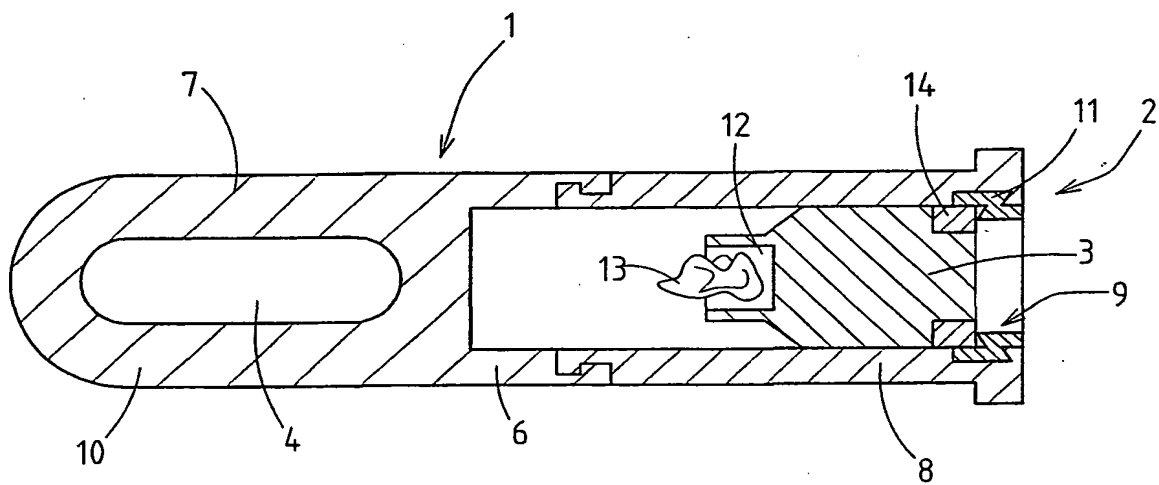


FIG. 1b.

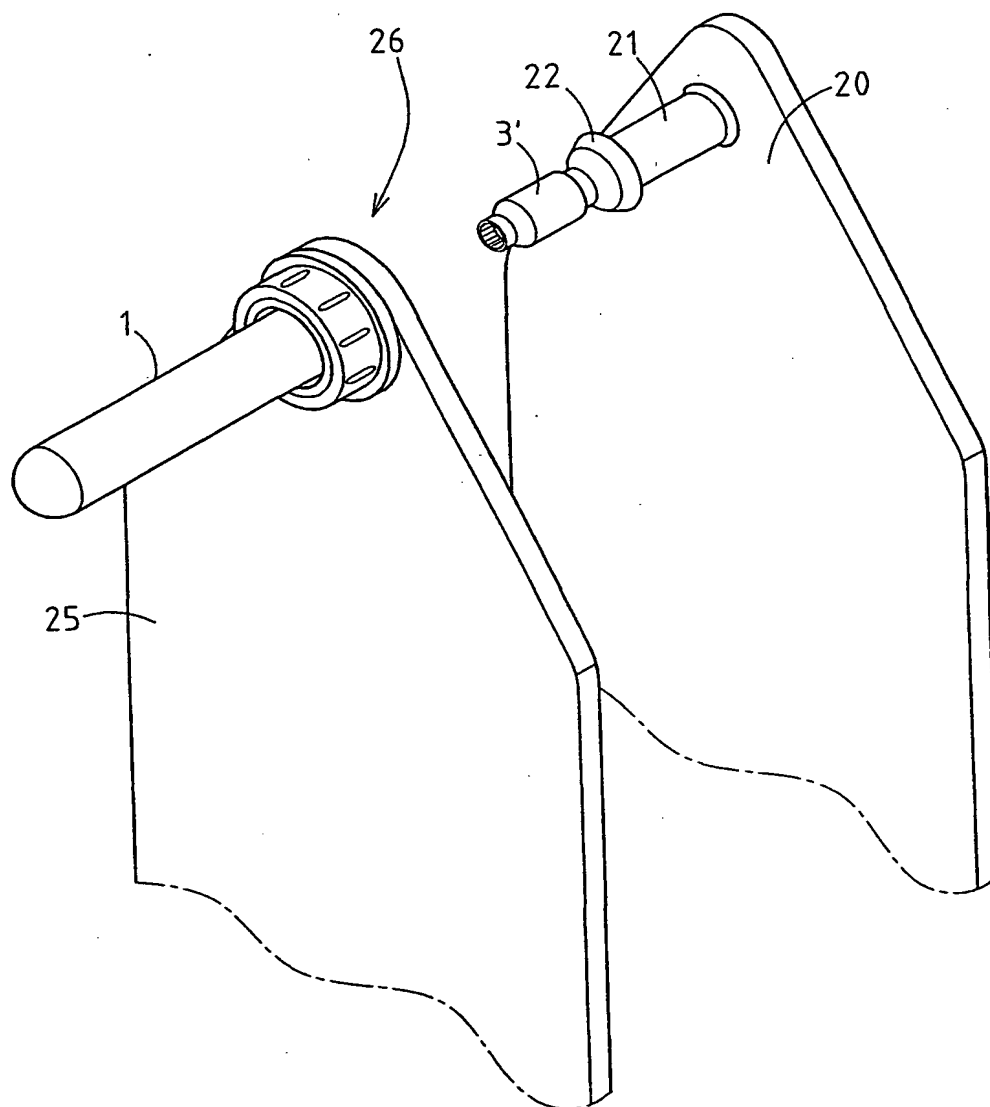


FIG. 2.

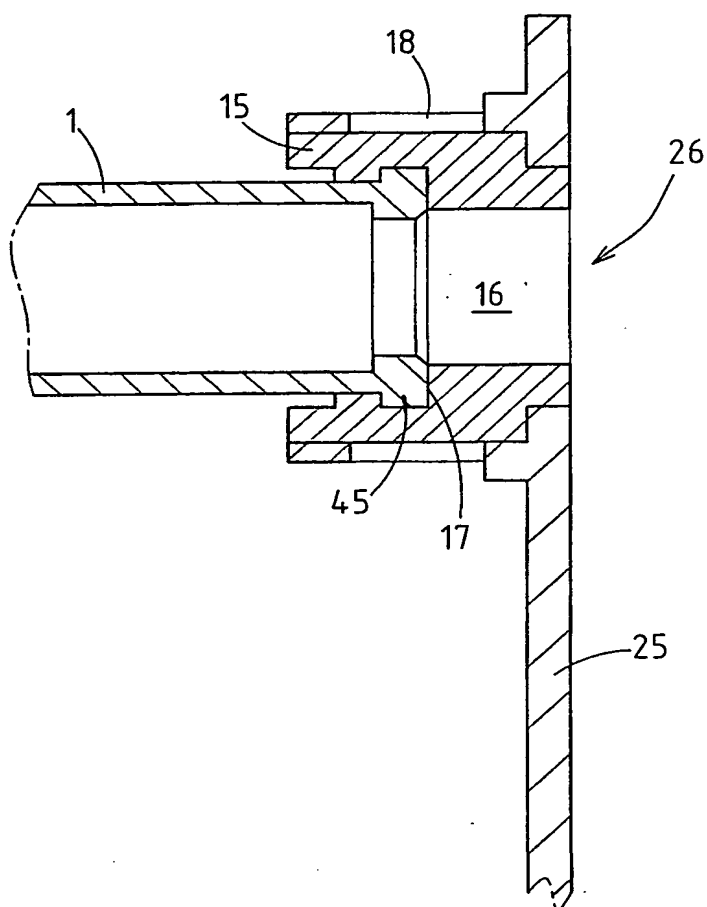


FIG. 3.

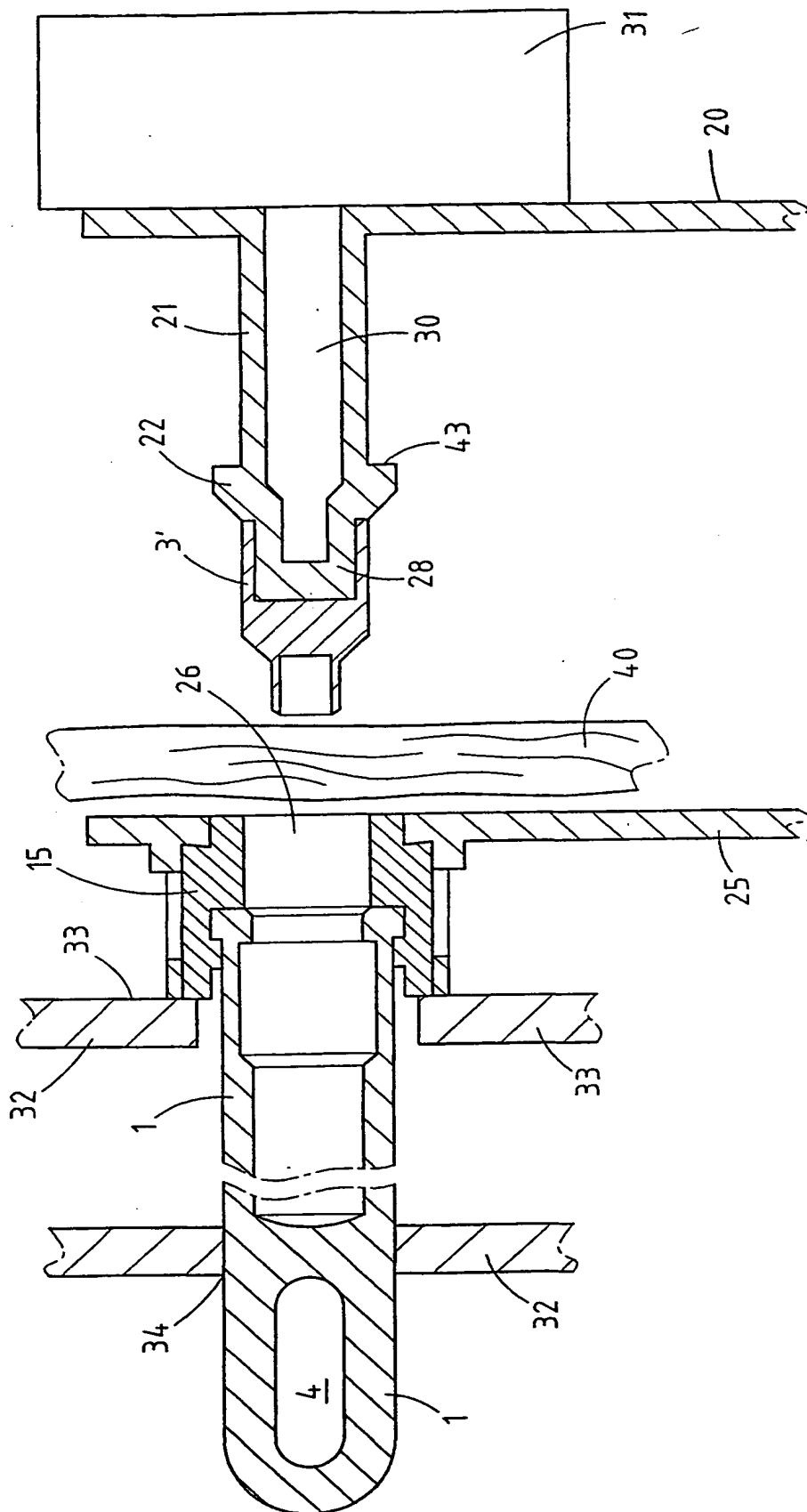


FIG. 4.

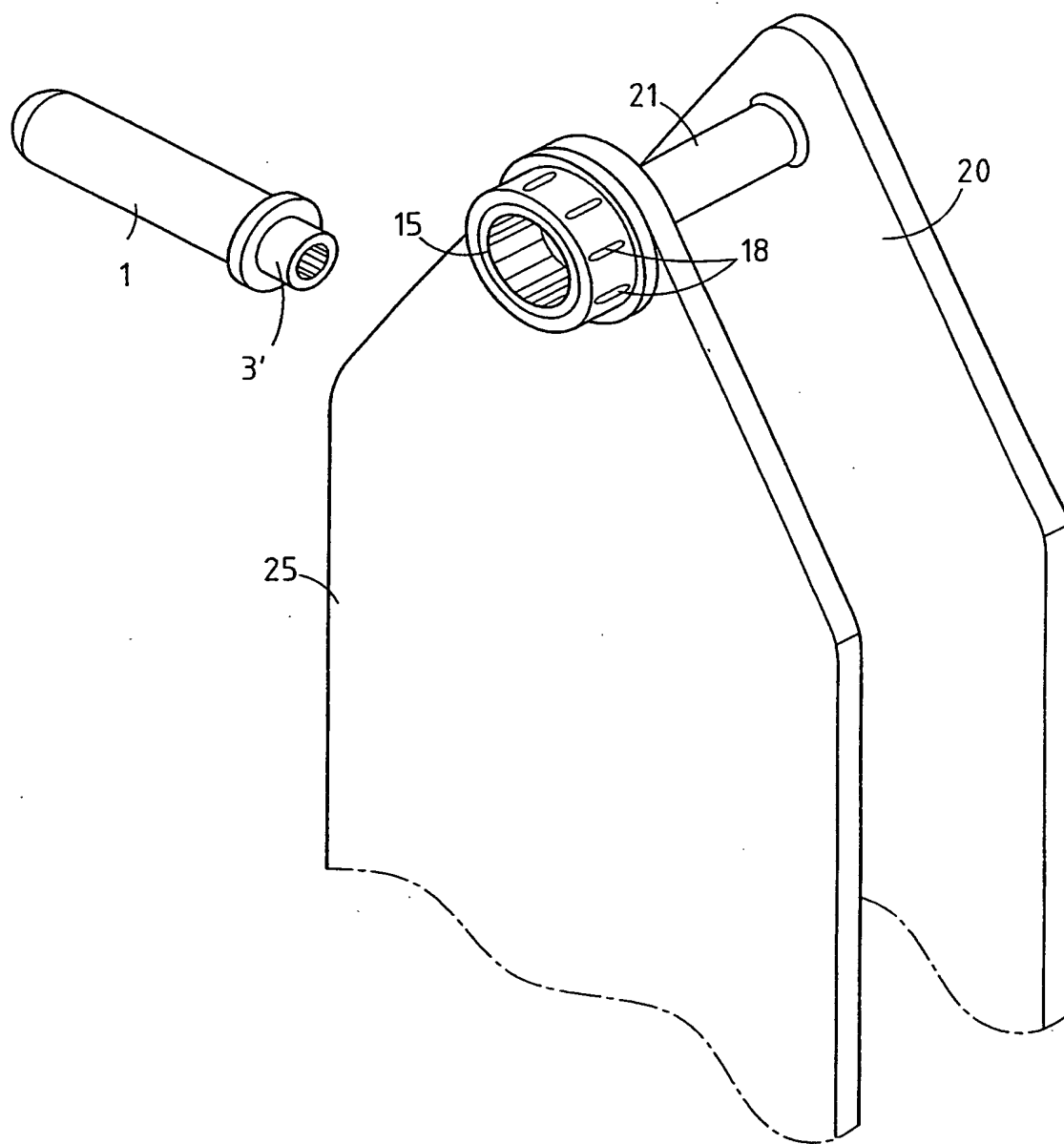


FIG. 5.

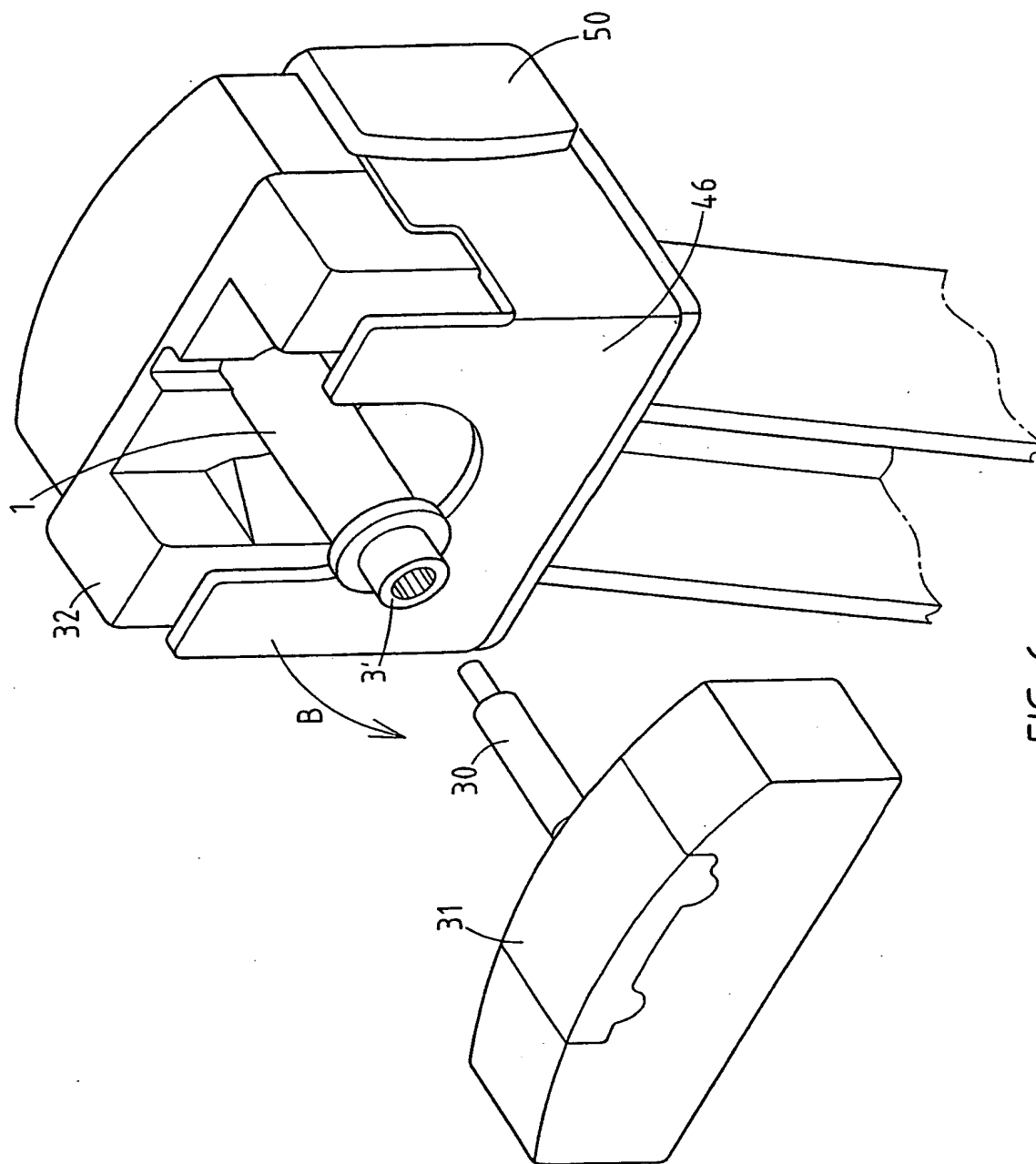
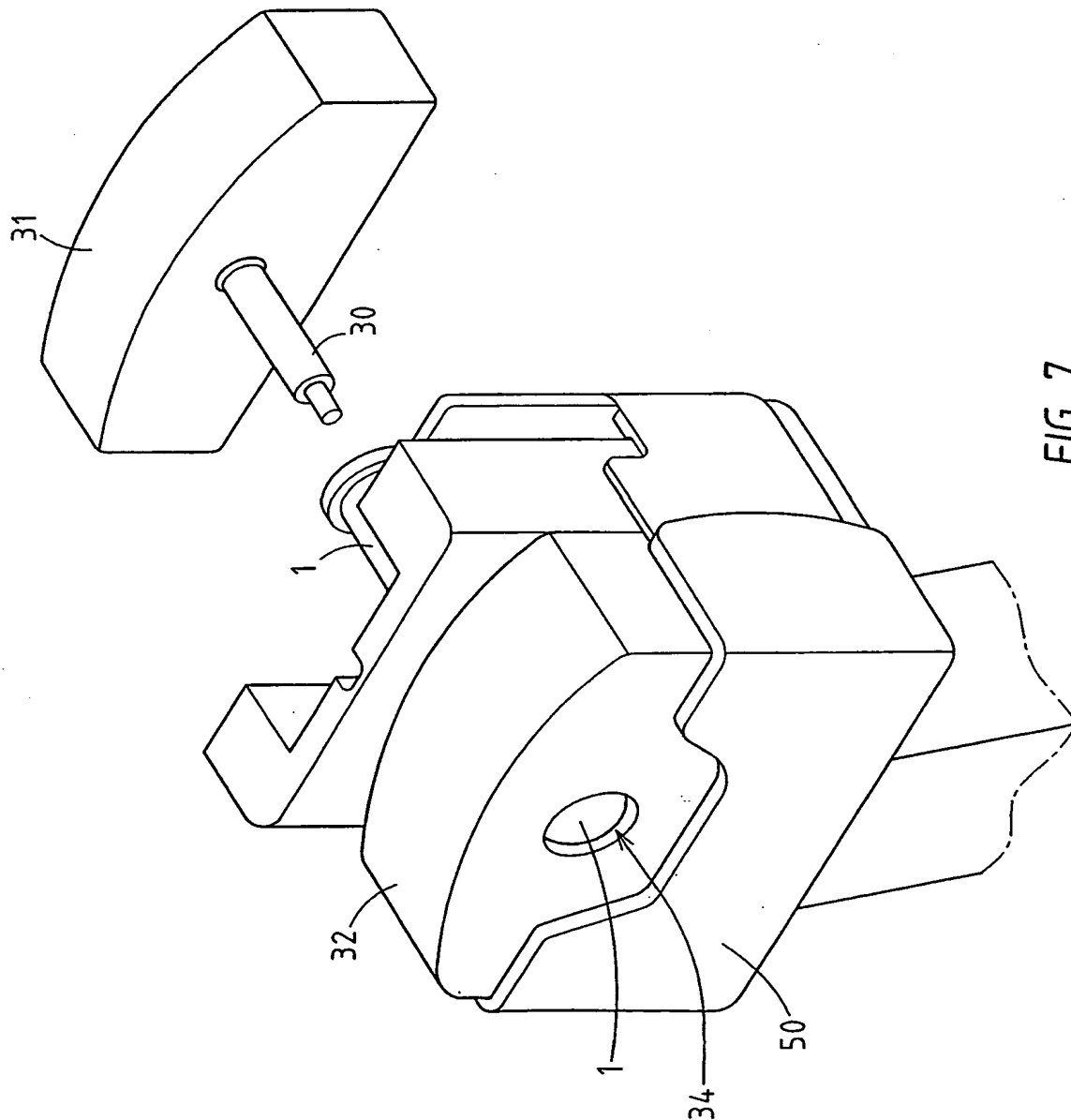


FIG. 6.



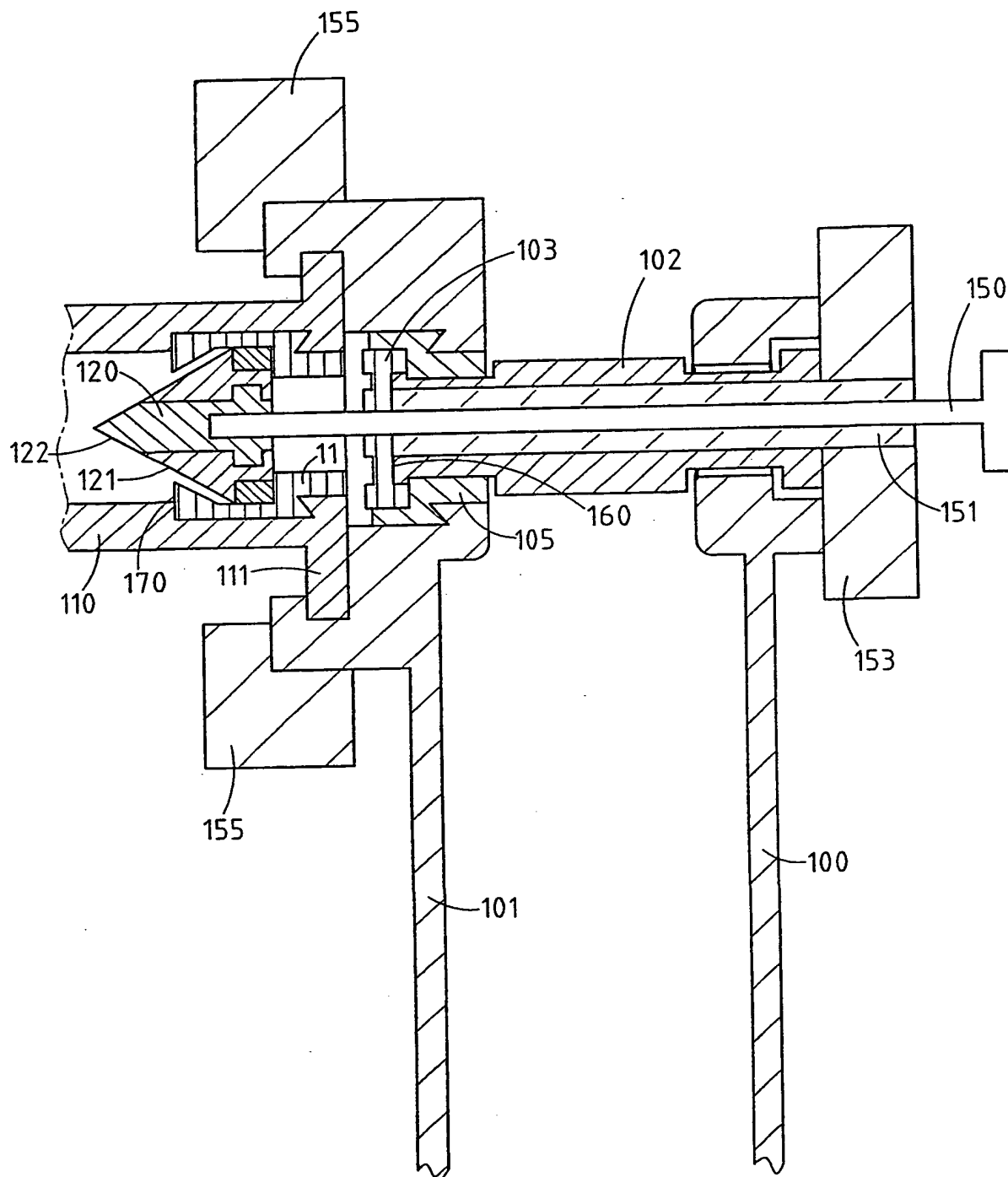


FIG. 8.

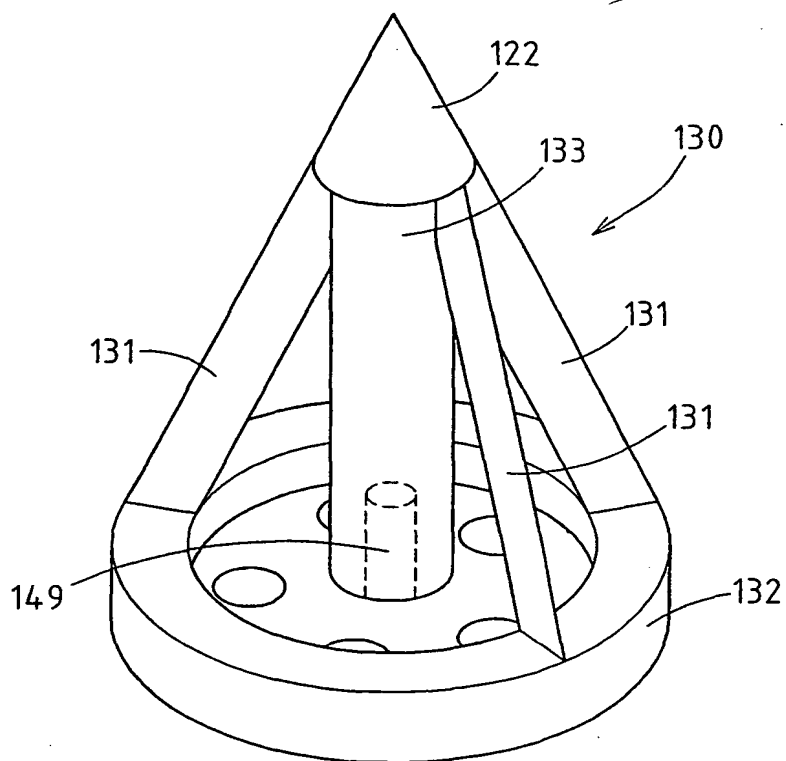


FIG. 9.

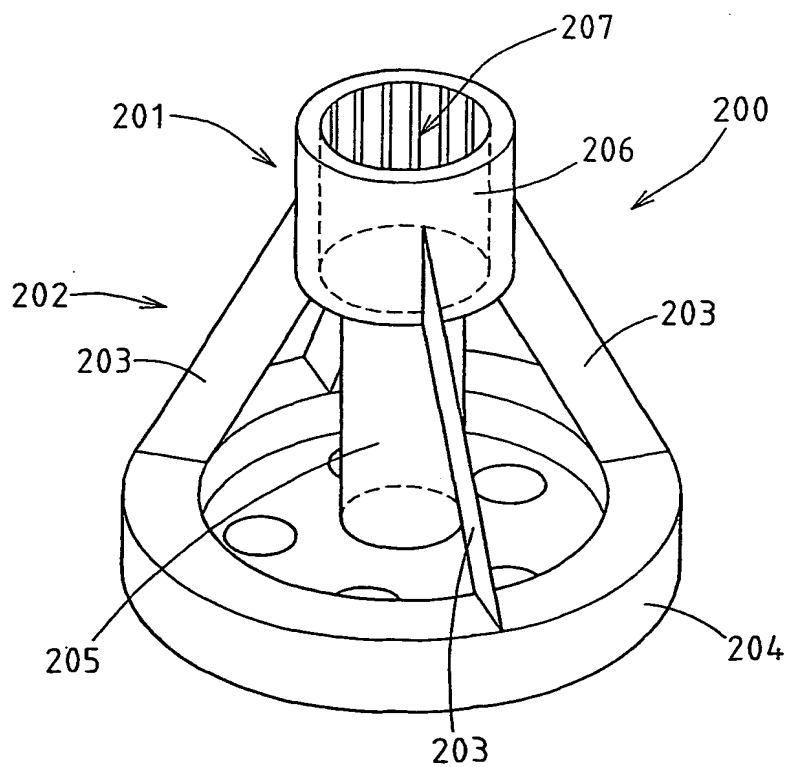


FIG. 10.

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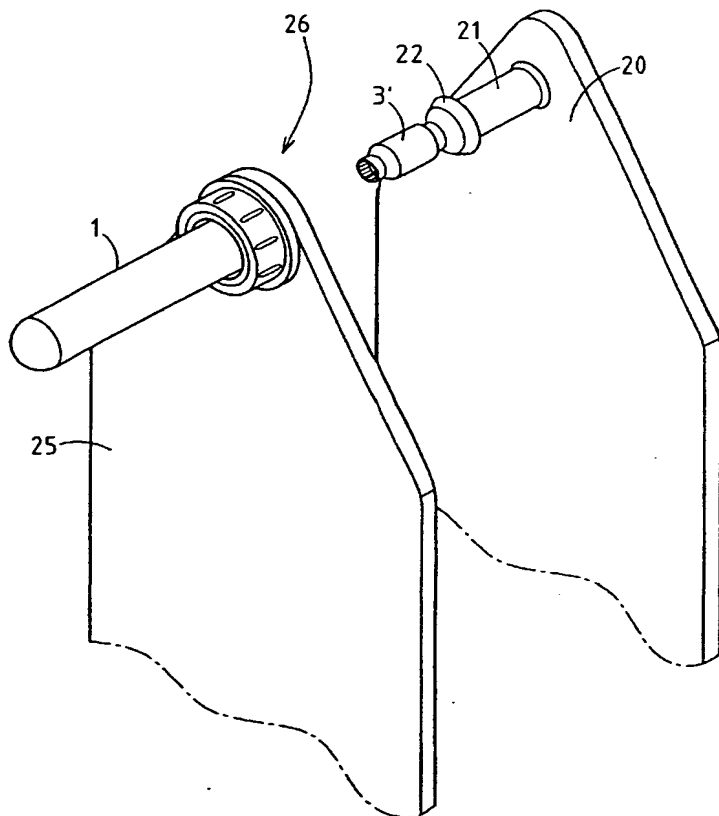
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[Continued on next page]

(54) Title: SYSTEM FOR TAGGING A BIOLOGICAL OBJECT AND FOR TAKING A SAMPLE OF THE BIOLOGICAL OBJECT



(57) Abstract: A system for tagging a biological object and taking a sample of the biological object, the object being in particular an animal. The system comprises a first tag part (20), a second tag part (25) and a pin (21) having a first end and a second end, which pin is connected to the first tag part at a first end thereof and which pin is provided with a head (22) at the second end. The system further comprises a sample container (1) having an opening for introducing a sample of biological material from the object in the sample container, which sample container has a body with a circumferential wall and at an axial end thereof the opening and at the opposite axial end a bottom. The sample container is connected via a detachable connection to the second tag part, such that the opening of the sample container is aligned with the receiving opening of the second tag part.

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Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	DE 200 22 647 U (BIOPSYTEC GMBH) 13 December 2001 (2001-12-13) the whole document	1,4,8
X	---	
	NL 1 012 000 C (PRAGMATIC NETWORK CREATIONS ET) 13 November 2000 (2000-11-13)	1,5,8,9
A	the whole document -----	2-4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *O* document referring to an oral disclosure, use, exhibition or other means
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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

19 April 2002

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Name and mailing address of the ISA

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Authorized officer

VON ARX, V

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 01/02157

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-15

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-15

System for tagging a biological object and taking a sample of the biological object with sample container fitted in a bore formed by an annular wall in an ear tag part.

2. Claims: 16, 17

System for tagging a biological object and taking a sample of the biological object with a plug having a body with a ring of hard material.

3. Claims: 18-21

System for tagging a biological object and taking a sample of the biological object with a plug having a point of hard material and being surrounded by cutting members.

4. Claim : 22

Tag applicator for tagging a biological object and taking a sample of the biological object with support mandrel.

5. Claim : 23

System for tagging a biological object and taking a sample of the biological object with a covering cap.

6. Claims: 24-27

System and method for tagging a biological object and taking a sample of the biological object with a transponder in the sample container.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 01/02157

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 20022647	U	13-12-2001	DE 10053022-A1	02-05-2002
			DE 20022647 U1	13-12-2001

NL 1012000	C	13-11-2000	NL 1012000 C2	13-11-2000
			EP 1060662 A1	20-12-2000
